

## PATENT ABSTRACTS OF JAPAN

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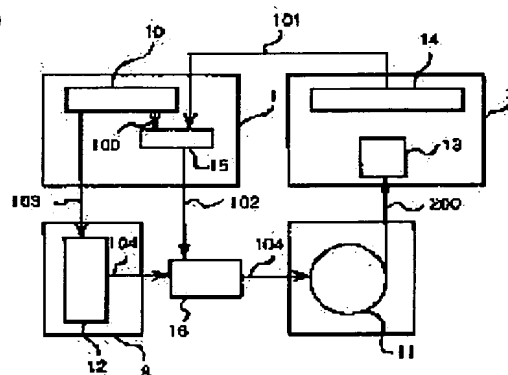
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## (54) CONTROL METHOD AND DEVICE FOR RADIOTHERAPY

## (57)Abstract:

**PURPOSE:** To provide a radiotherapy device and its controlling method and device, with which it is practicable to eliminate misirradiation with radiations and ensure safety of the patient in a treatment using radiations.

**CONSTITUTION:** A radiotherapeutical device is fed with a signal 100 to represent patient identification information included in therapy schedule information predetermined and a signal 101 to represent the patient identification information transmitted from the patient individually, and the comparing means 15 of this therapeutical device compares the two signals and emits a signal 102 to represent the result from comparison, and further a safety interlock mechanism 16 is furnished as a control means to control execution of the irradiational treatment to the patient on the basis of the given result from comparison.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The signal showing the patient identification information contained in the treatment-planning information set up beforehand and it are the control approach characterized by collating the signal showing the patient identification information independently transmitted from the patient side, and controlling implementation of the radiation therapy to a patient based on a collating result.

[Claim 2] The signal showing the patient identification information contained in the treatment-planning information set up beforehand and it are the control unit characterized by to have a collating means output the signal with which the signal showing the patient identification information independently transmitted from the patient side is inputted, they are collated, and a collating result is expressed, and the control means which control implementation of the radiation therapy to a patient based on the signal showing a collating result.

[Claim 3] The accelerator which are the therapy control means to which a medical practitioner treats, and a means to accelerate a charged particle, The accelerator control means which controls said accelerator based on the output signal of said therapy control means, In the radiation therapy system equipped with one or more exposure therapy means to perform the therapy controlled by said therapy control means using the charged particle beam accelerated by said accelerator The signal showing the patient identification information inputted and transmitted from the therapy control room equipped with said therapy control means, The radiation therapy system characterized by establishing the insurance interlocking device which controls implementation of radiation therapy by the signal with which it has a collating means to collate the signal showing the patient identification information by the side of the patient transmitted from the exposure treatment room equipped with said exposure therapy means, and the collating result is expressed.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a control unit at the radiation therapy system equipped with the insurance device for preventing treatment planning set up beforehand and the incorrect exposure by a patient's inequality, and its control approach list in the radiation therapy system using the charged particle beam accelerated by the accelerator.

[0002]

[Description of the Prior Art] In recent years, the therapy approach of using the charged particle beam accelerated by the accelerator for medicine, such as a gun therapy, is being put in practical use. However, since this accelerated charged particle beam has great effect also to the normal organization of the body while it is effective in destruction of a gun cell, it poses a problem with how important the radiation incorrect exposure to a patient is prevented on the occasion of a therapy. the configuration which takes interlocking with beam switch actuation and a treatment-room patient set-complete signal to JP,6-26604,B in order to prevent the incorrect exposure under set to a patient's exposure treatment room conventionally to this problem -- moreover, in order to prevent the incorrect exposure to the organization of those other than the affected part, for example, when the irradiation field under the time of treatment planning and exposure is not in agreement with JP,6-105922,A, equipment equipped with the means for stopping which stops an exposure is indicated. Furthermore automation of an exposure therapy is also advanced, for example, the bar code of a patient's clinical recording is read to JP,63-151161,U, and the call and the method of performing control of a therapeutic device are indicated in the therapeutic device parameter which corresponds from storage.

[0003]

[Problem(s) to be Solved by the Invention] With the above-mentioned conventional technique, collating with the patient set as treatment planning set up beforehand and the object of a therapy is not performed clearly, but the radiation incorrect exposure based on human errors, such as a take difference in a patient, may be performed. There is a problem that this possibility becomes high when those with two or more and a treatment schedule are choked up by especially the treatment room, and a patient's security becomes difficult.

[0004] By performing the above-mentioned collating clearly, the purpose of this invention loses the radiation incorrect exposure based on human errors, such as a take difference in a patient, and is for a control unit to provide for the radiation therapy system which can secure a patient's insurance more, and its control approach list.

[0005]

[Means for Solving the Problem] As for the signal showing the patient identification information contained in the treatment-planning information set up beforehand, and it, the above-mentioned purpose collates 2 of the signal showing the patient identification information independently transmitted from the patient side signals, and it is attained by the control approach which controls implementation of the radiation therapy to a patient based on a collating result.

[0006] Moreover, the signal showing the patient identification information contained in the treatment-planning information set up beforehand and it collate 2 of the signal showing the

patient identification information independently transmitted from the patient side signals, and are attained by establishing a collating means output the signal showing a collating result, and the control means which controls implementation of the radiation therapy to a patient based on the signal showing said collating result.

[0007] Moreover, the accelerator which are the therapy control means to which a medical practitioner treats, and a means to accelerate a charged particle, The accelerator control means which controls said accelerator based on the output signal of said therapy control means, In the radiation therapy system equipped with one or more exposure therapy means to perform the therapy controlled by said therapy control means using the charged particle beam accelerated by said accelerator The signal showing the patient identification information inputted and transmitted from the therapy control room equipped with said therapy control means, It has a collating means to collate the signal in which the patient identification information independently transmitted from the exposure treatment room equipped with the exposure therapy means is expressed as it, and is attained by establishing the insurance interlocking device which is the control means which controls implementation of radiation therapy by the signal showing the collating result.

[0008]

[Function] The signal showing the patient identification information contained in the treatment-planning information set up beforehand in this invention, By collating 2 of the signal in which the patient identification information independently transmitted from the patient side is expressed as it signals, and using the control approach which controls implementation of the radiation therapy to a patient based on a collating result Even if it is the case where correspondence of treatment planning and a patient cannot be taken, the inequality of treatment planning and a patient can be checked by the collating result, it becomes possible to prevent the radiation incorrect exposure to a patient, and a patient's insurance can be secured.

[0009] Moreover, the signal showing the patient identification information contained in the treatment-planning information set up beforehand, A collating means to output the signal with which 2 of the signal in which the patient identification information independently transmitted from the patient side is expressed as it signals are collated, and a collating result is expressed, By establishing the control means which controls implementation of the radiation therapy to a patient based on the signal showing a collating result Since a control means can function automatically and the radiation incorrect exposure to a patient can be prevented also when correspondence of treatment planning and a patient cannot be taken, a patient's insurance is further securable.

[0010] Moreover, the accelerator which are the therapy control means to which a medical practitioner treats, and a means to accelerate a charged particle, The accelerator control means which controls an accelerator based on the output signal of a therapy control means, In the radiation therapy system equipped with one or more exposure therapy means controlled by the therapy control means using the charged particle beam accelerated by the accelerator The signal showing the patient identification information inputted and transmitted from the therapy control room equipped with the therapy control means, It has a collating means to collate the signal in which the patient identification information independently transmitted from the exposure treatment room equipped with the exposure therapy means is expressed as it. By establishing the insurance interlocking device which is the control means which controls implementation of radiation therapy by the signal showing the collating result Since an insurance interlocking device can function automatically and the radiation incorrect exposure to a patient can be prevented even when correspondence of treatment planning and a patient cannot be taken, a patient's insurance is further securable.

[0011]

[Example] Hereafter, the example of this invention is explained with reference to a drawing.

[0012] Drawing 1 is the block diagram of the radiation therapy system concerning the 1st example of this invention. The accelerator 11 which are the therapy control means 10 to which a medical practitioner treats, and a means to accelerate a charged particle, The accelerator control means 12 which outputs the accelerator control signal 104 which controls an accelerator

11 based on the signal 103 showing the treatment-planning information outputted from the therapy control means 10, With the radiation therapy system equipped with one or more exposure therapy means 13 to irradiate the charged particle beam 200 accelerated by the accelerator 11 at a patient's affected part The signal 100 showing the patient identification information contained in the treatment-planning information inputted based on the clinical recording etc. from the therapy control room 1 equipped with the therapy control means 10, Independently of it, it is inputted by the IC card etc. from the exposure treatment room 2 equipped with the exposure therapy means 13. When the signal 102 with which the therapy control room 1 is equipped with a collating means 15 to collate the signal 101 showing the patient identification information by the side of the patient transmitted by the signal transmitting means 14, and the collating result is expressed shows coincidence of two signals, Even when radiation therapy is made possible, an inequality is shown and correspondence of treatment planning and a patient cannot be taken by establishing the insurance interlocking device 16 made impossible, the insurance interlocking device 16 can function, the radiation incorrect exposure to a patient can be prevented, and a patient's insurance can be secured. Although the collating means 15 was formed in the therapy control room 1, effectiveness is the same even if it prepares in the accelerator control room 3 equipped with the accelerator control means 12, or other locations. Moreover, besides an IC card, even if the signal 101 showing the patient identification information transmitted from the exposure treatment room 2 may be an individual recognition signal based on biological information and is a video signal etc., it can acquire the same effectiveness.

[0013] Drawing 2 is the block diagram of the radiation therapy system of the 2nd example of this invention. This is the radiation therapy system which has two or more therapy irradiation chambers, and is a radiation therapy system characterized by preparing in the excitation means of the deviation electromagnet for drawing the charged particle beam 200 accelerated in the insurance interlocking devices 16a and 16b and -- to exposure treatment room 2a, 2b, and --. The signal 100 showing the patient identification information contained in a patient's treatment-planning information set up beforehand in the therapy control room 1, The signals 101a and 101b with which it expresses independently the patient identification information by the side of exposure treatment room 2a transmitted by two or more exposure treatment room 2a, 2b, the signal transmitting means 14a and 14b with which -- was equipped, and --, 2b, and the patient who added the signal showing proper information (for example, \*\*\*\*\* etc.) of --, and -- are collated. An exposure therapy is enabled by exciting only the deviation electromagnet which draws the charged particle beam 200 accelerated in the exposure treatment room in agreement. Consequently, even if an accelerator 11 is still operational status, the output of the collating means 15 can prevent the incidence of the acceleration charged particle beam 200 to other exposure treatment rooms showing an inequality, and can prevent the radiation incorrect exposure to the patient of other treatment rooms. Although this example described the case where it had two or more exposure treatment room 2a, 2b, and -- about the radiation therapy system characterized by equipping the deviation section of a beam with the insurance interlocking device 16, this invention is effective even if it is the case where it has even if an exposure treatment room is the case of only one room, other irradiation chambers, for example, radioisotope generation room etc., etc.

[0014]

[Effect of the Invention] According to this invention, by collating the signal showing the patient identification information independently transmitted from a patient side, the signal showing the patient identification information contained in the treatment-planning information set up beforehand and it lose the radiation incorrect exposure to a patient, and can secure a patient's insurance.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block diagram of the 1st example of this invention.

[Drawing 2] The block diagram of the 2nd example of this invention.

[Description of Notations]

1 [ -- A therapy control means, 11 / -- An accelerator, 13 / -- An exposure therapy means, 14 / -- A signal transmitting means, 15 / -- A collating means, 16 / -- An insurance interlocking device, 100 / -- The signal, 101 showing the patient identification information contained in treatment-planning information / -- The signal, 102 showing the patient identification information by the side of a patient / -- The signal, 103 showing a collating result / -- The signal, 104 showing treatment-planning information / -- Accelerator control signal. ] -- Therapy control room, 2 -- An exposure treatment room, 3 -- Accelerator control room, 10

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## 技術表示箇所

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**S**

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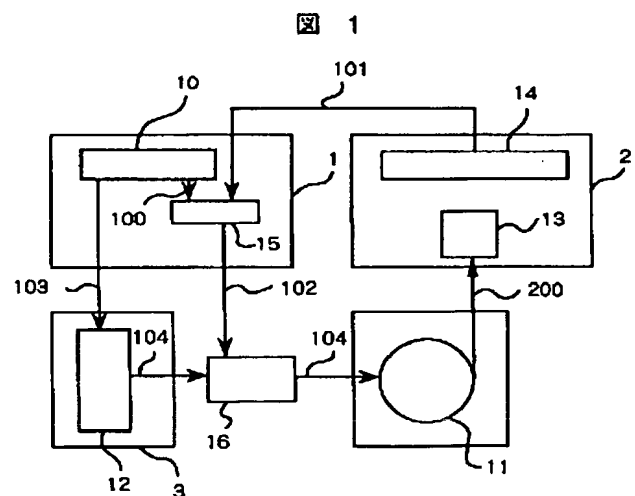
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(54) 【発明の名称】 放射線治療の制御方法並びに制御装置

(57) 【要約】

【目的】放射線を用いた治療で、放射線の誤照射を無くし、患者の安全を確保できる放射線治療装置及びその制御方法並びに制御装置を提供する。

【構成】 予め設定された治療計画情報に含まれる患者識別情報を表す信号１００と、それとは独立に患者側から送信された患者識別情報を表す信号１０１の二信号を入力し、照合を行いその照合結果を表す信号１０２を出力する照合手段１５と、照合結果に基づいて患者への放射線照射治療の実施を制御する制御手段である安全インターロック機構１６を備える。



**【特許請求の範囲】**

【請求項 1】 予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号とを照合し、照合結果に基づいて患者への放射線治療の実施を制御することを特徴とする制御方法。

【請求項 2】 予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号とを入力し、それらを照合し、照合結果を表す信号を出力する照合手段と、照合結果を表す信号に基づいて患者への放射線治療の実施を制御する制御手段とを備えたことを特徴とする制御装置。

【請求項 3】 医師が治療を行う治療制御手段と、荷電粒子を加速する手段である加速器と、前記治療制御手段の出力信号に基づいて前記加速器の制御を行う加速器制御手段と、前記加速器によって加速された荷電粒子ビームを用い、前記治療制御手段により制御される治療を行う一つ又は複数の照射治療手段を備えた放射線治療装置において、前記治療制御手段を備えた治療制御室より入力、送信された患者識別情報を表す信号と、前記照射治療手段を備えた照射治療室より送信された患者側の患者識別情報を表す信号を照合する照合手段を備え、その照合結果を表す信号によって放射線治療の実施を制御する安全インターロック機構を設けたことを特徴とする放射線治療装置。

**【発明の詳細な説明】****【0001】**

【産業上の利用分野】 本発明は、加速器により加速された荷電粒子ビームを用いた放射線治療装置において、予め設定された治療計画と患者の不一致による誤照射を防止するための安全機構を備えた放射線治療装置及びその制御方法並びに制御装置に関する。

**【0002】**

【従来の技術】 近年、加速器により加速された荷電粒子ビームをガン治療などの医療に用いる治療方法が実用化されつつある。しかし、この加速された荷電粒子ビームはガン細胞の破壊に有効である反面、人体の正常な組織に対しても多大な影響を与えるため、治療に際して患者への放射線誤照射を如何に防ぐかが重要な問題となる。この問題に対して、従来、患者の照射治療室へのセット中の誤照射を防ぐため、例えば、特公平6-26604号公報に、ビーム切り換え動作と治療室患者セット完了信号とのインターロックをとる構成が、また患部以外の組織への誤照射を防ぐため、例えば特開平6-105922号公報に治療計画時と照射中の照射野が一致しない場合、照射を停止させる停止手段を備えた装置が記載されている。さらに照射治療の自動化も進められ、例えば実開昭63-151161号公報に患者のカルテのバーコードを読み取り、記憶装置より対応する治療装置パラメータを呼出し、治療

装置の制御を行う方法が記載されている。

**【0003】**

【発明が解決しようとする課題】 上記従来技術では、予め設定された治療計画と治療の対象となる患者との照合が明確に行われておらず、患者の取り扱いなどのヒューマンエラーに基づく放射線誤照射を行う可能性がある。特に治療室が複数あり、治療スケジュールの詰まっている場合などはこの可能性が高くなり、患者の安全確保が困難になるという問題がある。

10 【0004】 本発明の目的は、上記照合を明確に行うことによって患者の取り扱いなどのヒューマンエラーに基づく放射線誤照射を無くし、患者の安全をより確保できる放射線治療装置及びその制御方法並びに制御装置の提供することにある。

**【0005】**

【課題を解決するための手段】 上記目的は、予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号の二信号を照合し、照合結果に基づいて患者への放射線治療の実施を制御する制御方法によって達成される。

20 【0006】 また、予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号の二信号を照合し、照合結果を表す信号を出力する照合手段と、前記照合結果を表す信号に基づいて患者への放射線治療の実施を制御する制御手段を設けることによって達成される。

30 【0007】 また、医師が治療を行う治療制御手段と、荷電粒子を加速する手段である加速器と、前記治療制御手段の出力信号に基づいて前記加速器の制御を行う加速器制御手段と、前記加速器によって加速された荷電粒子ビームを用い、前記治療制御手段により制御される治療を行う一つ又は複数の照射治療手段とを備えた放射線治療装置において、前記治療制御手段を備えた治療制御室より入力、送信された患者識別情報を表す信号と、それとは独立に、例えば、照射治療手段を備えた照射治療室より送信された患者識別情報を表す信号を照合する照合手段を備え、その照合結果を表す信号によって放射線治療の実施を制御する制御手段である安全インターロック機構を設けることによって達成される。

**【0008】**

40 【作用】 本発明では、予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号の二信号を照合し、照合結果に基づいて患者への放射線治療の実施を制御する制御方法を用いることによって、治療計画と患者の対応が取れていない場合であっても、照合結果により治療計画と患者の不一致が確認でき、患者への放射線誤照射を防ぐことが可能となり、患者の安全を確保することができる。



【0009】また、予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信された患者識別情報を表す信号の二信号を照合し、照合結果を表す信号を出力する照合手段と、照合結果を表す信号に基づいて患者への放射線治療の実施を制御する制御手段を設けることによって、治療計画と患者の対応が取れていない場合にも自動的に制御手段が機能し、患者への放射線誤照射を防ぐことができるので、さらに患者の安全を確保することができる。

【0010】また、医師が治療を行う治療制御手段と、荷電粒子を加速する手段である加速器と、治療制御手段の出力信号に基づいて加速器の制御を行う加速器制御手段と、加速器によって加速された荷電粒子ビームを用い、治療制御手段によって制御される一つ又は複数の照射治療手段とを備えた放射線治療装置において、治療制御手段を備えた治療制御室より入力、送信された患者識別情報を表す信号と、それとは独立に、例えば照射治療手段を備えた照射治療室より送信された患者識別情報を表す信号を照合する照合手段を備え、その照合結果を表す信号によって放射線治療の実施を制御する制御手段である安全インターロック機構を設けることによって、治療計画と患者の対応が取れていない場合でも自動的に安全インターロック機構が機能し、患者への放射線誤照射を防ぐことができるので、さらに患者の安全を確保することができる。

#### 【0011】

【実施例】以下、本発明の実施例を図面を参照して説明する。

【0012】図1は、本発明の第1の実施例にかかる放射線治療装置のブロック図である。医師が治療を行う治療制御手段10と、荷電粒子を加速する手段である加速器11と、治療制御手段10より出力される治療計画情報を表す信号103に基づいて加速器11の制御を行う加速器制御信号104を出力する加速器制御手段12と、加速器11によって加速された荷電粒子ビーム200を患者の患部に照射する一つ又は複数の照射治療手段13とを備えた放射線治療装置で、治療制御手段10を備えた治療制御室1よりカルテ等に基づいて入力された治療計画情報に含まれる患者識別情報を表す信号100と、それとは独立に、例えば照射治療手段13を備えた照射治療室2よりICカード等によって入力され、信号送信手段14により送信された患者側の患者識別情報を表す信号101を照合する照合手段15を治療制御室1に備え、その照合結果を表す信号102が二信号の一致を示すとき、放射線治療を可能とし、不一致を示すときは不可能とする安全インターロック機構16を設けることによって、治療計画と患者の対応が取れていない場合でも安全インターロック機構16が機能し、患者への放射線誤照射を防ぎ、患者の安全を確保することができ

る。照合手段15を治療制御室1に設けたが、加速器制御手段12を備えた加速器制御室3またはその他の場所に設けても効果は同じである。また、照射治療室2より送信される患者識別情報を表す信号101は、ICカードの他に生体情報に基づく個体識別信号であっても良いし、映像信号等であっても同じ効果を得ることができる。

【0013】図2は、本発明の第2の実施例の放射線治療装置のブロック図である。これは、治療照射室を複数有する放射線治療装置で、安全インターロック機構16a、16b、…を、照射治療室2a、2b、…へ加速された荷電粒子ビーム200を引き込むための偏向電磁石の励磁手段に設けたことを特徴とする放射線治療装置である。治療制御室1で予め設定された患者の治療計画情報に含まれる患者識別情報を表す信号100と、それとは独立に複数の照射治療室2a、2b、…に備えられた信号送信手段14a、14b、…によって送信された照射治療室2a、2b、…の固有情報(例えば室番号など)を表す信号を付加した患者側の患者識別情報を表す信号101a、101b、…とを照合し、一致する照射治療室に加速された荷電粒子ビーム200を引き込む偏向電磁石のみを励磁することによって照射治療を可能とする。この結果、加速器11は運転状態のままであっても照合手段15の出力が不一致を表わす他の照射治療室への加速荷電粒子ビーム200の入射を防止でき、他の治療室の患者への放射線誤照射を防ぐことができる。この例では、ビームの偏向部に安全インターロック機構16を備えることを特徴とした放射線治療装置について、複数の照射治療室2a、2b、…を有する場合について述べたが、照射治療室が1室だけの場合であっても、他の照射室、例えば放射性同位元素生成室などを備えている場合であっても本発明は有効である。

#### 【0014】

【発明の効果】本発明によれば、予め設定された治療計画情報に含まれる患者識別情報を表す信号と、それとは独立に患者側から送信される患者識別情報を表す信号を照合することによって、患者への放射線誤照射を無くし、患者の安全を確保できる。

#### 【図面の簡単な説明】

【図1】本発明の第1の実施例のブロック図。

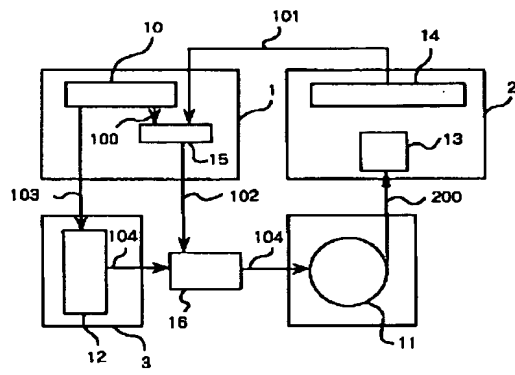
【図2】本発明の第2の実施例のブロック図。

#### 【符号の説明】

1…治療制御室、2…照射治療室、3…加速器制御室、10…治療制御手段、11…加速器、13…照射治療手段、14…信号送信手段、15…照合手段、16…安全インターロック機構、100…治療計画情報に含まれる患者識別情報を表す信号、101…患者側の患者識別情報を表す信号、102…照合結果を表す信号、103…治療計画情報を表す信号、104…加速器制御信号。

【図 1】

図 1



【図 2】

図 2

